

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Canceled)
2. (Currently amended) A method as in Claim [[1]] 33, further comprising the step of identifying the presence of one or more cues in the audiovisual content.
3. (Original) A method as in Claim 2, wherein the step of identifying the presence of one or more cues in the audiovisual content further comprises evaluating the audiovisual content to identify the presence of one or more cues regarding one or more of the following possible characteristics of the audiovisual content: 1) an audio pause in the audio content, 2) a sequence of black frames in the visual content, 3) a scene cut or fade in the visual content, 4) a significant change in average volume in the audio content, 5) the presence of music in the audio content, 6) speaker identity, 7) the density of scene breaks or fades in the visual content, 8) the absence of a usually present network icon, 9) the degree of motion in a period of visual content, 10) the presence of text in the visual content, 11) the occurrence of specified closed-captioning formatting signals and 12) the absence of closed-captioning.
4. (Original) A method as in Claim 2, wherein the step of identifying the presence of one or more cues in the audiovisual content further comprises evaluating the audiovisual content to identify the presence of a cue regarding the absence of a usually present network icon.
5. (Original) A method as in Claim 2, wherein the step of identifying the presence of one or more cues in the audiovisual content further comprises evaluating the audiovisual content to identify the presence of a cue regarding the presence of music in the audio content.
6. (Original) A method as in Claim 2, wherein the step of identifying the presence of one or more cues in the audiovisual content further comprises evaluating the audiovisual content to identify the presence of a cue regarding the density of scene breaks or fades in the visual content.

7. (Original) A method as in Claim 2, wherein the step of identifying the presence of one or more cues in the audiovisual content further comprises evaluating the audiovisual content to identify the presence of a cue regarding speaker identity.

8. (Currently amended) A system for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of time, each commercial break including one or more commercials, the system comprising:

means for identifying candidate times within the duration of time spanned by the set of audiovisual content based on an evaluation of one or more cues identified in the audiovisual content, each candidate time representing a possible starting and/or ending time of a commercial;

means for assigning a score to each candidate time;

means for evaluating, for each of one or more candidate times, 1) one or more secondary cues that are each different from the one or more cues used to identify the candidate time, and/or 2) the relationship between the candidate time and one or more other candidate times, wherein the score assigned to the candidate time can be adjusted based on the evaluation; and

means for constructing the one or more commercial breaks based on an evaluation of 1) the scores of the candidate times after the step of evaluating and 2) a relationship between, or relationships among, the candidate times, comprising:

comparing a relationship between, or relationships among, the candidate times to one or more probability models that specify an expected relationship between, or relationships among, commercial start and/or end times;

selecting the candidate time with the highest adjusted score to be a commercial start and/or end time in a current commercial break;

successively evaluating each candidate time not yet part of a commercial break, in order of decreasing adjusted score, for possible inclusion in the current commercial break as a commercial start and/or end time, wherein the evaluation of each candidate time for possible inclusion in the current commercial break comprises the steps of:

determining whether each probability of the temporal separation between the candidate time being evaluated and a candidate time already included in the current commercial break is above a specified threshold value;

determining whether the probability of the duration of the current commercial break, if the candidate time being evaluated is added to the current commercial break, is above a specified threshold value; and

determining whether each probability of the temporal separation between the candidate time being evaluated and an already existing commercial break, if any, is above a specified threshold value, wherein if each of the three probabilities is above the corresponding specified threshold value, the candidate time being evaluated is added to the current commercial break;

determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break;

if there are candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break, performing the steps of:

selecting the candidate time having the highest adjusted score above the specified threshold value that has not yet been included in a commercial break and has not yet been excluded from inclusion in a commercial break;

determining whether each probability of the temporal separation between the selected candidate time and an already existing commercial break is above a specified threshold value;

if each probability is above the specified threshold value, performing the steps of:

identifying the selected candidate time as a commercial start and/or end time in a current commercial break; and

repeating the step of successively evaluating; and

if each probability is not above the specified threshold value, performing the steps of:

excluding the selected candidate time from inclusion in a commercial break; and

repeating the step of determining whether there are candidate times having an adjusted score above a specified threshold value that have not

yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break; and
if there are no candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break, performing the step of identifying the start and end time of each commercial break and the start time of each commercial in each commercial break.

9. (Currently amended) A computer readable storage medium or media encoded with one or more computer programs including instructions for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of time, each commercial break including one or more commercials, the one or more computer programs comprising:

instructions for identifying candidate times within the duration of time spanned by the set of audiovisual content based on an evaluation of one or more cues identified in the audiovisual content, each candidate time representing a possible starting and/or ending time of a commercial;

instructions for assigning a score to each candidate time;

instructions for evaluating, for each of one or more candidate times, 1) one or more secondary cues that are each different from the one or more cues used to identify the candidate time, and/or 2) the relationship between the candidate time and one or more other candidate times, wherein the score assigned to the candidate time can be adjusted based on the evaluation; and

instructions for constructing the one or more commercial breaks based on an evaluation of 1) the scores of the candidate times after the step of evaluating and 2) a relationship between, or relationships among, the candidate times, comprising:

comparing a relationship between, or relationships among, the candidate times to one or more probability models that specify an expected relationship between, or relationships among, commercial start and/or end times;

selecting the candidate time with the highest adjusted score to be a commercial start and/or end time in a current commercial break;

successively evaluating each candidate time not yet part of a commercial break, in order of decreasing adjusted score, for possible inclusion in the current commercial break

as a commercial start and/or end time, wherein the evaluation of each candidate time for possible inclusion in the current commercial break comprises the steps of:

determining whether each probability of the temporal separation between the candidate time being evaluated and a candidate time already included in the current commercial break is above a specified threshold value;

determining whether the probability of the duration of the current commercial break, if the candidate time being evaluated is added to the current commercial break, is above a specified threshold value; and

determining whether each probability of the temporal separation between the candidate time being evaluated and an already existing commercial break, if any, is above a specified threshold value, wherein if each of the three probabilities is above the corresponding specified threshold value, the candidate time being evaluated is added to the current commercial break;

determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break;

if there are candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break, performing the steps of:

selecting the candidate time having the highest adjusted score above the specified threshold value that has not yet been included in a commercial break and has not yet been excluded from inclusion in a commercial break;

determining whether each probability of the temporal separation between the selected candidate time and an already existing commercial break is above a specified threshold value;

if each probability is above the specified threshold value, performing the steps of:

identifying the selected candidate time as a commercial start and/or end time in a current commercial break; and

repeating the step of successively evaluating; and

if each probability is not above the specified threshold value, performing the steps of:

excluding the selected candidate time from inclusion in a commercial break; and
repeating the step of determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break; and
if there are no candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break, performing the step of identifying the start and end time of each commercial break and the start time of each commercial in each commercial break.

10 – 11. (Canceled)

12. (Currently amended) A method as in Claim [[1]] 33, wherein the step of assigning further comprises the step of assigning the same score to each candidate time.

13. (Currently amended) A method as in Claim [[1]] 33, wherein the step of assigning further comprises the step of assigning a score to each candidate time in accordance with the type of cue or cues evaluated to identify the candidate time.

14. (Currently amended) A method as in Claim [[1]] 33, wherein the step of assigning further comprises the step of assigning a score to each candidate time in accordance with the degree of presence in the audiovisual content of the cue or cues evaluated to identify the candidate time.

15. (Currently amended) A method as in Claim [[1]] 33, wherein the step of assigning further comprises the step of assigning a score to each candidate time in accordance with the degree of confidence of identification of the cue or cues evaluated to identify the candidate time.

16. (Currently amended) A method as in Claim [[1]] 33, wherein the step of evaluating further comprises the step of determining the presence or absence of a secondary cue within a time window that includes the candidate time or to which the candidate time is sufficiently proximate.

17. (Previously presented) A method as in Claim 16, wherein the duration and/or location of the time window depends on the type of the secondary cue.

18. (Previously presented) A method as in Claim 16, wherein the score is adjusted in accordance with the type of the secondary cue.

19. (Previously presented) A method as in Claim 16, wherein the score is adjusted in accordance with the degree of presence of the secondary cue.

20. (Previously presented) A method as in Claim 16, wherein the score is adjusted in accordance with the degree of confidence of identification of the secondary cue.

21. (Currently amended) A method as in Claim ~~[[1]]~~ 33, wherein the step of evaluating further comprises the step of comparing the candidate time and/or a relationship between, or relationships among, the candidate time and one or more other candidate times to one or more probability models that specify one or more expected characteristics of commercial start and/or end times, and/or an expected relationship between, or relationships among, commercial start and/or end times.

22. (Previously presented) A method as in Claim 21, wherein one of the probability models specifies the expected temporal separation of commercial start and end times.

23. (Previously presented) A method as in Claim 21, wherein one of the probability models specifies the expected location of one or more commercial start and/or end times within the duration of time spanned by the set of audiovisual content.

24. (Previously presented) A method as in Claim 21, wherein one of the probability models is derived from statistics concerning any type of audiovisual content.

25. (Previously presented) A method as in Claim 21, wherein one of the probability models is derived from statistics concerning only audiovisual content that is of the same type as the set of audiovisual content in which the one or more commercials breaks are being detected.

26. (Currently amended) A method as in Claim [[1]] 33, wherein the score adjustment varies in accordance with the magnitude of the score before adjustment.

27. (Currently amended) A method as in Claim [[1]] 33, further comprising the step of eliminating candidate times having an adjusted score below a specified threshold.

28. (Canceled)

29. (Currently amended) A method as in Claim [[28]] 33, wherein one of the probability models specifies the expected duration of a commercial break.

30. (Currently amended) A method as in Claim [[28]] 33, wherein one of the probability models specifies the expected temporal separation of commercial breaks.

31. (Currently amended) A method as in Claim [[28]] 33, wherein one of the probability models is derived from statistics concerning any type of audiovisual content.

32. (Currently amended) A method as in Claim [[28]] 33, wherein one of the probability models is derived from statistics concerning only audiovisual content that is of the same type as the set of audiovisual content in which the one or more commercials breaks are being detected.

33. (Currently amended) A method ~~as in Claim 28, wherein the step of constructing further comprises~~ for detecting one or more commercial breaks in a set of audiovisual content spanning a duration of time, each commercial break including one or more commercials, the method comprising the steps of:

identifying candidate times within the duration of time spanned by the set of audiovisual content based on an evaluation of one or more cues identified in the audiovisual content, each candidate time representing a possible starting and/or ending time of a commercial;

assigning a score to each candidate time;

evaluating, for each of one or more candidate times, 1) one or more secondary cues that are each different from the one or more cues used to identify the candidate time, and/or 2) the relationship between the candidate time and one or more other candidate times, wherein the score assigned to the candidate time can be adjusted based on the evaluation; and

constructing the one or more commercial breaks based on an evaluation of 1) the scores of the candidate times after the step of evaluating and 2) a relationship between, or relationships among, the candidate times, including by:

comparing a relationship between, or relationships among, the candidate times to one or more probability models that specify an expected relationship between, or relationships among, commercial start and/or end times;

selecting the candidate time with the highest adjusted score to be a commercial start and/or end time in a current commercial break;

successively evaluating each candidate time not yet part of a commercial break, in order of decreasing adjusted score, for possible inclusion in the current commercial break as a commercial start and/or end time, wherein the evaluation of each candidate time for possible inclusion in the current commercial break comprises the steps of:

determining whether each probability of the temporal separation between the candidate time being evaluated and a candidate time already included in the current commercial break is above a specified threshold value;

determining whether the probability of the duration of the current commercial break, if the candidate time being evaluated is added to the current commercial break, is above a specified threshold value; and

determining whether each probability of the temporal separation between the candidate time being evaluated and an already existing commercial break, if any, is above a specified threshold value, wherein if each of the three probabilities is above the corresponding specified threshold value, the candidate time being evaluated is added to the current commercial break;

determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break;

if there are candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break, performing the steps of:

selecting the candidate time having the highest adjusted score above the specified threshold value that has not yet been included in a commercial break and has not yet been excluded from inclusion in a commercial break;

determining whether each probability of the temporal separation between the selected candidate time and an already existing commercial break is above a specified threshold value;

if each probability is above the specified threshold value, performing the steps of:

identifying the selected candidate time as a commercial start and/or end time in a current commercial break; and

repeating the step of successively evaluating; and

if each probability is not above the specified threshold value, performing the steps of:

excluding the selected candidate time from inclusion in a commercial break; and

repeating the step of determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break; and

if there are no candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break and have not yet been excluded from inclusion in a commercial break, performing the step of identifying the start and end time of each commercial break and the start time of each commercial in each commercial break.

34. (Previously presented) A method as in Claim 33, wherein the step of constructing further comprises the steps of:

determining whether there are any candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break;

if there are candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break, performing the steps of:

for each such candidate time that has not yet been included in a commercial break, performing the steps of:

identifying the most temporally proximate commercial break to the candidate time;

determining whether the probability of the duration of the most temporally proximate commercial break, if the candidate time is added to that commercial break, is above a specified threshold value; and

determining whether each probability of the temporal separation between the candidate time and a commercial break other than the most temporally proximate commercial break, if any, is above a specified threshold value, wherein if each of the two probabilities are above the corresponding specified threshold value, the candidate time is added to the most temporally proximate commercial break;

if the candidate time is added to the most temporally proximate commercial break, performing the steps of:

repeating the step of successively evaluating, for each candidate time having an adjusted score above a specified threshold value that has not yet been included in a commercial break, wherein the resulting commercial break is a modified commercial break ;

for each candidate time of the modified commercial break, performing the steps of:

computing the average of the probabilities of each temporal separation between the candidate time and a temporally adjacent candidate time;

if the average is below a specified threshold value, performing the steps of:

if the adjusted score of the candidate time is lower than the average adjusted score of the adjacent candidate times, eliminating the candidate time; and

if the adjusted score of the candidate time is not lower than the average adjusted score of the adjacent candidate times, eliminating any adjacent candidate time that is less than a specified duration of time from the candidate time;

computing the average score of all of the candidate times of the modified commercial break;

comparing the average score of all of the candidate times of the modified commercial break to the average score of all of the candidate times of the commercial break before modification;

if the average score of all of the candidate times of the modified commercial break is greater than the average score of all of the candidate times of the original commercial break before modification, replacing the original commercial break with the modified commercial break; and

if the average score of all of the candidate times of the modified commercial break is not greater than the average score of all of the candidate times of the original commercial break before modification, retaining the original commercial break; and

if the candidate time is not added to the most temporally proximate commercial break, performing the step of excluding the candidate time from inclusion in a commercial break; and

determining whether a modified commercial break replaced an original commercial break;

if a modified commercial break replaced an original commercial break, repeating the step of determining whether there are any candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break and the conditional step appropriate for the result of that determination; and

if no modified commercial break replaced an original commercial break, performing the step of maintaining the identification of the start and end time of each commercial break and the start time of each commercial in each commercial break as existent prior to the step of determining whether there are candidate times having an

adjusted score above a specified threshold value that have not yet been included in a commercial break; and

if there are no candidate times having an adjusted score above the specified threshold value that have not yet been included in a commercial break, performing the step of maintaining the identification of the start and end time of each commercial break and the start time of each commercial in each commercial break as existent prior to the step of determining whether there are candidate times having an adjusted score above a specified threshold value that have not yet been included in a commercial break.

35. (Currently amended) A method as in Claim [[1]] 33, further comprising the step of editing the audiovisual content based on the detected commercial breaks.

36. (Previously presented) A method as in Claim 35, wherein the step of editing the audiovisual content based on the detected commercial breaks further comprises the step of deleting the audiovisual content representing a commercial.

37. (Previously presented) A method as in Claim 35, wherein the step of editing the audiovisual content based on the detected commercial breaks further comprises the step of modifying the audiovisual content representing a commercial.

38. (Currently amended) A method for viewing audiovisual content in which commercial breaks have been detected as in Claim [[1]] 33, comprising the step of skipping a commercial during viewing of the audiovisual content.

39. (Currently amended) A method for reviewing audiovisual content in which commercial breaks have been detected as in Claim [[1]] 33, comprising the step of searching for a commercial within the audiovisual content.

40. (Currently amended) A method as in Claim [[1]] 33, wherein the audiovisual content is represented by a television signal.

41. (Currently amended) A method as in Claim ~~[[1]]~~ 33, wherein the audiovisual content is represented by computer-readable data.

42. (Previously presented) A method as in Claim 41, wherein audiovisual content is represented by computer-readable data acquired via a computer network.

43. (Previously presented) A method as in Claim 42, wherein audiovisual content is represented by computer-readable data acquired via the Internet.

44. (Currently amended) A method as in Claim ~~[[1]]~~ 33, wherein the method detects the one or more commercial breaks in real time as the audiovisual content is acquired for display by a display device.

45 – 68. (Canceled)